

REMARKS

By this amendment, independent claim 15 is revised to place this application in condition for allowance. Currently, claims 15-19 are before the Examiner for consideration on their merits.

Revised claim 15 now defines that the ingot used to form the wafer has a low density of COPs in the direction of pulling of the ingot, and that the thus-formed wafer has the low density of COPs in the thickness direction and in the surface portion. Support for this amendment may be found in a number of places in the application. The specification, see page 8, lines 16-23, teaches that the crystal originated particles (COPs) density is reduced when the time period when passing through the temperature range of 1150 to 1070 °C is within 20 minutes. This is in the ingot stage, so that it can be said that the ingot has a lowered density of COPs as a result of this treatment. Page 10, lines 1 and 2, indicate that the sliced wafer is from the ingot having the generated COPs. Since the ingot is formed with a reduced density due to the control of time when passing through the temperature range of 1150-1070 °C, it is fair to conclude that the sliced wafer has the low density of COPs across its entire thickness. Therefore, the specification can be said to support the limitations in claim 15 saying that the ingot is formed with a low density of COPs as a result of the process, that the sliced wafer is obtained from this ingot means, and that the sliced wafer would have the same low density of COPs. Also, since the wafer is cut from the ingot, the low density of COPs would extend across its entire thickness and this limitation is also supported by the specification as originally filed.

In the rejection, the Examiner maintains the rejection of claims 15-19 under either 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a) based on Tamatsuka's US patent and its PCT counterpart WO (collectively hereinafter "Tamatsuka").

It is respectfully submitted that the amendments to claim 15 removes Tamatsuka as references under either 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a). The basis for the rejection was that despite the fact that the wafer of Tamatsuka may be made by a different method, the end product wafer was indistinguishable from the wafer as claimed and therefore, the prior art either anticipated the claims or rendered the claims obvious.

Claim 15 now defines the wafer as having a low density of COPs along the entire thickness direction of the wafer and in the claimed surface portion. This structural feature of the invention is not found in Tamatsuka. As has been previously argued, Tamatsuka teaches a method of controlling the COP density that involves heat treatment of the wafer. More specifically, the wafer is first grown using the Czochralski or CZ method and the ingot formed thereby is sliced into wafers. The sliced wafer is then subjected to a two step heat treatment to diffuse oxygen outwardly. This outward diffusion of oxygen in the wafer occurs in the vicinity of the surface of the wafer such that the vicinity has a lower density of COPs, e.g., at least to a depth of 5 microns. This two step heat treatment involves a first step of heating the wafer under a non-oxidative atmosphere at temperatures in a range of 1100-1300 °C. The second step subjects the wafer to a heat treatment in the temperature range of 700-1300 °C under an oxidative atmosphere without cooling to a temperature lower than 700 °C.

From Tamatsuka's teachings, it can be concluded that the wafer sliced from the ingot would have a conventional structure based on the CZ method, and that the treated wafer would have surface portions with reduced COP density. The question remains though as to whether it can be said that the reduced COP density occurs throughout the entire thickness of the wafer as is now stated in claim 15. Applicants contend that the answer to this question is no; the process forming the wafer of claim 15 is fundamentally different than that used in Tamatsuka. The different processing of Tamatsuka precludes the conclusion that the wafer formed by such process meets the limitations at issue.

Claim 15 not only describes the wafer of the invention but also the processing and control of the growing process. It is this control that achieves the low density of COPs in the ingot and sliced wafer, and permits the wafer to be repeatedly cleaned without adversely affecting the wafer surface density of defects. The control of the process is such that the low density of COPs is formed in the ingot and this results in a sliced wafer incorporating the low density across its thickness. Put another way, the entire thickness of the wafer sees the low density of COPs caused by the control over the growing process. This low density structure in the wafer is not the same as that found in Tamatsuka since Tamatsuka treats the already sliced wafer by heat treating so as to alter the surface portion of the wafer, not the wafer's entire thickness. It is contended that the language specifying that the wafer of claim 15 having its entire thickness containing the low density of COPs defines a structure that is not found in Tamatsuka. Since this structure is not present in Tamatsuka, the Examiner cannot say that the

wafer of Tamatsuka is the same as the claimed wafer and reject claim 15 under 35 U.S.C. § 102(b).

While the Examiner could contend that the heat treatment of Tamatsuka results in a low COP density in the wafer along its entire thickness, the Examiner must have a factual basis for such a contention. Applicants submit that this position is untenable since there is no teaching within the four corners of Tamatsuka that would lead to such a conclusion. If anything, Tamatsuka's teaching of treating the formed wafer using diffusion would contradict a contention that the low density of COPs in Tamatsuka is throughout the thickness of the wafer. In order to make a *prima facie* case of anticipation, the Examiner must have a factual basis to support it. In the instant situation, there are no reasons to support the contention that Tamatsuka teaches a wafer as now described in claim 15.

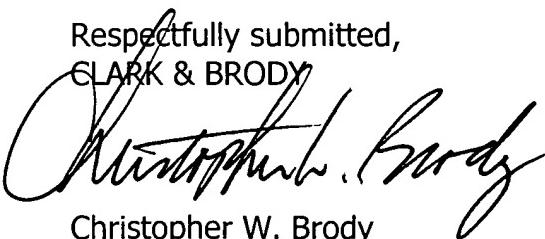
Moreover, there is no basis to reject claim 15 under 35 U.S.C. § 103(a) given its amended form. If the Examiner admits that Tamatsuka does not teach a wafer having a low density of COPs along its entire thickness as now claimed, the Examiner would have to somehow conclude that it would be obvious to modify the wafer of Tamatsuka, which has only a surface portion of the wafer with a low density of COPs to one that have the low density of COPs along its entire thickness. However, how would such a result be attained using Tamatsuka as a starting point? Without a teaching of such processing, the Examiner has no basis to allege that Tamatsuka renders claim 15 obvious under 35 U.S.C. § 103(a).

Any conclusion that asserts that claim 15 is obvious from the teachings of Tamatsuka is the blatant reliance on hindsight, and any such rejection could not be sustained on appeal.

In light of the arguments made above, claim 15 is neither anticipated nor rendered obvious over Tamatsuka and the rejection of record must be withdrawn. The dependent claims 16-19 are also in condition for allowance by reason of their dependency on claim 15.

If the Examiner believes that a further interview with Applicants' attorney would help expedite prosecution of this application, the Examiner is invited to telephone the undersigned at 202-835-1753. The above also constitutes a complete response to all issues raised in the outstanding Office Action of August 22, 2006.

Again, reconsideration and allowance of this application is respectfully requested. Applicants petition for a three month extension of time. A check to cover the petition fee of \$1,020.00 is enclosed. Please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,
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